

# Stage- and Cell-Specific Expression of Soluble Guanylyl Cyclase Alpha and Beta Subunits, cGMP-Dependent Protein Kinase I Alpha and Beta, and Cyclic Nucleotide-Gated Channel Subunit 1 in the Rat Testis

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Several studies suggest that nitric oxide (NO) and cyclic guanosine monophosphate (cGMP) modulate testicular function. In this study, we examined the expression of cGMP-dependent protein kinase G-I (PKG-I), and cyclic nucleotide-gated channel 1 (CNG-1), 2 known mediators of cGMP action, and the expression of soluble guanylyl cyclase (sGC) subunits in the rat testis. Immunohistochemical analysis revealed that the alpha subunit of sGC was expressed in the blood vessels and Leydig cells of adult rat testes. In addition, the sGC alpha subunit was observed in the acrosomal structures of spermatids undergoing the middle and later stages of spermiogenesis, but not in mature spermatozoa. Similar localization and expression patterns were seen for the sGC beta subunit, indicating coexpression of the sGC subunits. PKG-I was expressed in blood vessels and in the acrosomal region of spermatids during the early and middle stages of spermiogenesis but was not observed in Leydig cells or in mature spermatozoa. In contrast to sGC and PKG-I, CNG-1 was expressed only in cytoplasm and the residual bodies of late-stage (17-19) spermatids, with no staining observed in blood vessels and Leydig cells. These results demonstrate that sGC, PKG-I, and CNG-1 are expressed in a stage- and cell-specific manner in the rat testis. The distinct temporal patterns of expression of these components of cGMP signaling pathways suggest different physiological roles for sGC, PKG-I, and CNG-1 in spermiogenesis and steroidogenesis.

Key words: Cyclic guanosine monophosphate, sGC, PKG-I, CNG-1

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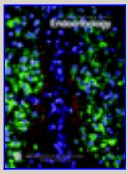
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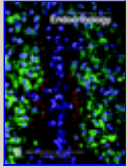
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